

BIOLOGICAL EVALUATION  
Western Budworm Infestation

National Forest, Indian, State,  
and Private Lands

Region 3

1968

In August, an egg mass survey was conducted to measure 1968 defoliation levels, to predict population trends, and to predict defoliation classes of the western budworm for 1969. The survey shows the western budworm populations and the acreage infested were at their lowest level in 10 years.

Currently, 83,000 acres of mixed conifer are infested in New Mexico, a decrease of 217,000 acres from the 1967 total of 300,000 (see map). These acreage decreases occurred on the Cloudcroft and Eagle Nest Units, with decreases of 90,000 and 127,000 acres, respectively. On the Eastern Division of the Carson National Forest, 80,000 acres were found to be lightly defoliated in 1968. The predicted trend for 1969 for this area is static; light defoliation is expected again next year. The predicted trend and defoliation will have little affect on the timber resources of this area. On the Philmont Scout Ranch, 3,000 acres were found to be moderately defoliated in 1968. The predicted trend for 1969 for this area is static; moderate defoliation is expected again next year. The aesthetics of the infested area are being blemished, but this infestation has not been active long enough, or populations high enough, to result in significant growth loss of sawtimber or mortality of smaller trees. All areas, with the exception of the Philmont Scout Ranch and the Taos Unit, are classed as endemic.

Control measures against the budworm are not recommended for 1969.

General Information

Insect - Western budworm, Choristoneura occidentalis Freeman

Hosts - Douglas-fir, Pseudotsuga menziesii (Mirb.) Franco  
White fir, Abies concolor (Gord. & Glend.) Lindl  
Corkbark fir, Abies lasiocarpa var. arizonica (Merriam) Lemm.  
Blue spruce, Picea pungens Engelm.  
Engelmann spruce, Picea engelmannii Parry

### Sampling Procedures

A "Sequential Plan for Western Budworm Egg Mass Surveys in the Central and Southern Rocky Mountains,"<sup>1/</sup> prepared by Dr. M. E. McKnight, Rocky Mountain Forest and Range Experiment Station, has been adopted as the survey procedure for Region 3 in 1968. Previously, a modified half-branch method developed by Carolin and Coulter<sup>2/</sup> had been used. Under the new procedure, a minimum of 25 codominant Douglas-fir trees were sampled in each entomological unit. Entomological units, based on geographic boundaries of known infested or previously infested areas, were divided into plots. From each plot, a minimum of 5 and a maximum of 10 trees were sampled. Two 24-inch midcrown branch samples were cut, by use of a pole pruner, from each tree, bagged and taken to the laboratory in Santa Fe for examination.

Needles with egg masses or similar artifacts were removed from the foliage samples at the Santa Fe laboratory and held for examination. The egg masses were later separated as to old or new by an entomologist for analysis in determining population trends and intensity.

### Methods of Analysis

In the laboratory, current defoliation for both Douglas-fir and white fir (when represented in the stand) was measured by counting a total of 100 randomly selected buds from five trees of each species within each plot. The counted buds were classed as either damaged or not. The results were then compared to a table prepared by McKnight<sup>3/</sup> for estimating defoliation of the plot.

Predicted defoliation classes were determined by comparing the density of new egg masses with a table in McKnight's plan that shows relationship of egg masses to expected defoliation.

Population trends were determined by inspection of 1968 measured defoliation levels with the predicted defoliation for 1969 based on new egg mass counts of 1968.

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<sup>1/</sup> McKnight, M. E. (R-2 author), (R-3 author). Sequential plan for western budworm egg mass surveys in the central and southern Rocky Mountains. (Manuscript in preparation as a Rocky Mountain Forest & Range Exp. Sta. Res. Pap.)

<sup>2/</sup> Carolin, V. M. and W. K. Coulter. 1959. Research finding relative to biological evaluation of spruce budworm infestation in Oregon. Office Report, U.S. Forest Service, Pacific Northwest Forest & Range Exp. Sta. 39 pp.

<sup>3/</sup> McKnight, M. E. Estimation of defoliation of Douglas-fir and white fir by the western budworm. (Manuscript in preparation at Rocky Mountain Forest & Range Exp. Sta.)

### Results and Discussion

The number of new masses, percent current defoliation of Douglas-fir and white fir, predicted defoliation classes for 1969, and unit trends for 1969 are presented in Table 1.

The adoption of McKnight's sampling plan has resulted in an estimated saving of \$1,500 in its first year of operation. An 80-percent saving in laboratory costs was realized by using the 24-inch versus half-branch method. McKnight's scheme allows greater mobility and flexibility of the field sampling crews since permanent plot trees are not required. On an operational basis, the sequential plan proved very successful in Region 3.

With the continued decline of the western budworm populations, and trend toward an endemic condition, control is not recommended against this pest.

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Table 1.—Summary of western budworm egg mass survey data, Region 3, 1968

Unit & Description Sample Plot	Total acres sampled	Acres infested	Percent defoliation 1968		New egg masses per 1,000 sq. in. foliage	Predicted defoliation class for Douglas-fir 1969	Infes- tation trend for unit
			Douglas- fir	White fir			
<u>Taos Unit</u> (Eastern Division of Carson NF)	150,000	80,000					
Lower Arroyo Hondo			12	26	4.0	Light	
Manzanita Canyon			18	36	2.0	Light	
Upper Arroyo Hondo			32	4	0.0	Undetectable	
Goose Creek			1	—	0.0	Undetectable	
Bonita Canyon			45	—	2.4	Light	
Cabresto Creek			35	—	0.4	Undetectable	
Pioneer Creek			13	23	1.6	Light	
Rio Pueblo (Simpson Canyon)			1	1	0.0	Undetectable	
Upper Capulin Canyon (Capulin Peak)			6	19	2.4	Light	
Lower Capulin Canyon (Capulin Canyon)			19	23	2.0	Light	
Garcia Park			1	—	0.0	Undetectable	
Rio Chiquito			1	—	0.0	Undetectable	
Picuris			0	—	0.0	Undetectable	Static
<u>Eagle Nest Unit</u> (State & private lands east of Carson NF, Scout Ranch)	31,000	3,000					
Cyphers Mine (Philmont Scout Ranch)			28	61	6.4	Moderate	
Middle Fork Canyon (Philmont Scout Ranch)			69	69	7.2	Moderate	
Garcia Peak (Philmont Scout Ranch)			1	—	0.4	Undetectable	
Wildlife Area (N. Mex. State Land)			0	0	0.0	Undetectable	Static
<u>Cloudcroft Unit</u> (Lincoln NF & adjacent Mescalero Indian Res.)	150,000	0					
Alamo			0	—	0.0	Undetectable	
Benson Ridge			0	—	0.0	Undetectable	



Table 1.—Summary of western budworm egg mass survey data, Region 3, 1968 (continued)

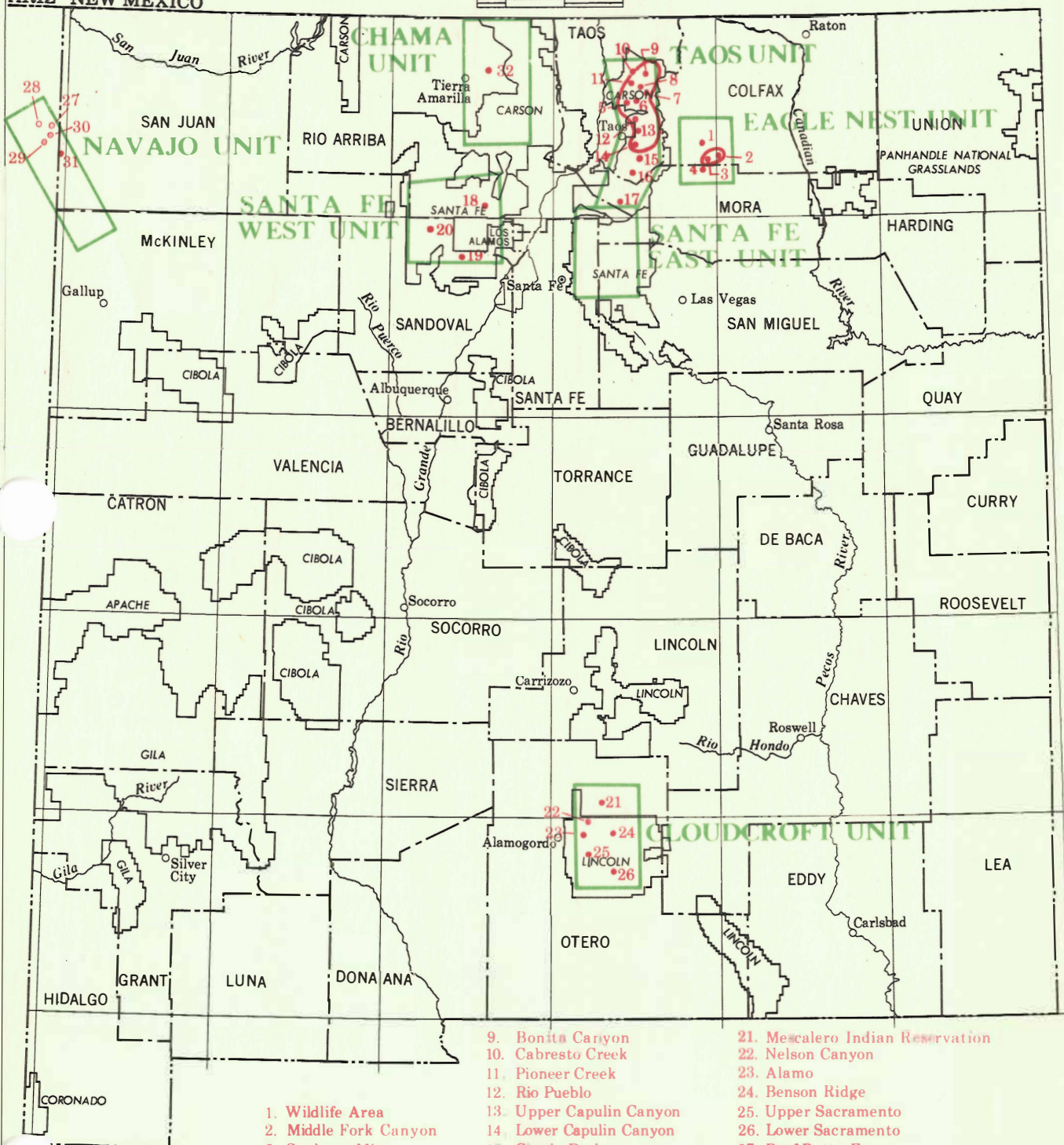
Unit & Description Sample Plot	Total acres sampled	Acres infested	Percent defoliation 1968		New egg masses per 1,000 sq. in. foliage	Predicted defoliation class for Douglas-fir 1969	Infes- tation trend for unit
			Douglas- fir	White fir			
<u>Cloudcroft Unit (continued)</u>							
Nelson Canyon			6	3	0.0	Undetectable	
Mescalero Indian Reservation			0	---	0.0	Undetectable	
Upper Sacramento			0	---	0.0	Undetectable	
Lower Sacramento			1	---	0.8	Undetectable	
Moore Canyon			1	---	0.0	Undetectable	Static
<u>Navajo Indian Reservation Unit</u>	103,000	0					
Roof Butte East			0	---	0.0	Undetectable	
Roof Butte West			0	---	0.0	Undetectable	
Roof Butte Burn			0	---	1.0	Undetectable	
Washington Pass			0	---	0.0	Undetectable	
Dry Well			0	---	0.0	Undetectable	Static
<u>Santa Fe West (Western Division of Santa Fe NF)</u>	200,000	0					
Santa Clara			0	---	0.0	Undetectable	
Jemez			0	---	0.0	Undetectable	
La Jara			0	---	0.0	Undetectable	Static
<u>Santa Fe East (Eastern Division of Santa Fe NF)</u>	300,000	0	Area not sampled--infestation endemic				
<u>Chama Unit (Private land west of Carson NF)</u>	150,000	0					
Brazos Box			0	---	0.0	Undetectable	Static
<u>North Kaibab Unit (North Rim of Grand Canyon NP &amp; North Division of Kaibab NF)</u>	100,000	0	0	---	0.0	Undetectable	Static

# BIOLOGICAL EVALUATION WESTERN BUDWORM INFESTATION NATIONAL FOREST AND ADJACENT INDIAN, STATE, AND PRIVATE LANDS ARIZONA & NEW MEXICO

1968

10 0 20 40 Mi.

ARIZ NEW MEXICO



- 1. Wildlife Area
- 2. Middle Fork Canyon
- 3. Cyphers Mine
- 4. Garcia Peak
- 5. Lower Arroyo Hondo
- 6. Manzanita Canyon
- 7. Upper Arroyo Hondo
- 8. Goose Creek

- 9. Bonita Canyon
- 10. Cabresto Creek
- 11. Pioneer Creek
- 12. Rio Pueblo
- 13. Upper Capulin Canyon
- 14. Lower Capulin Canyon
- 15. Garcia Park
- 16. Rio Chiquito
- 17. Picuris
- 18. Santa Clara
- 19. Jemez
- 20. La Jara

- 21. Mescalero Indian Reservation
- 22. Nelson Canyon
- 23. Alamo
- 24. Benson Ridge
- 25. Upper Sacramento
- 26. Lower Sacramento
- 27. Roof Butte East
- 28. Roof Butte West
- 29. Roof Butte Burn
- 30. Washington Pass
- 31. Dry Well
- 32. Brazos Box

Entomological Unit  
Infested Area  
4 Sample Plot